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## *Introducing ICT in schools in England: Rationale and consequences*

### **Abstract**

This paper provides a critical perspective on the attempts to promote the use of ICT in teaching and learning in England. It describes the rationale given for the introduction of ICT in terms of its potential to impact on educational standards, to contribute to developing a curriculum which has more vocational / social significance and, more generally, to provide a catalyst for curriculum reform. The introduction of ICT is underpinned by the argument that schools should show a higher degree of correspondence with a wider world in which the use of technology is pervasive. However, the claims made for ICT display excessive optimism and a sense of 'inevitability'. ICT has had only a modest impact on schools though impact has to be considered in the context of what can realistically be expected: the contribution of ICT has not been negligible. Future development in the use of ICT should be more measured and adaptive taking account of the multi-dimensional nature of technology.

Michael Hammond

Institute of Education

University of Warwick

CV4 7AL

m.hammond@warwick.ac.uk

## *Introducing ICT in schools in England: Rationale and consequences*

This paper provides a critical perspective on the attempts to promote the use of ICT in teaching and learning in England. The first section describes the rationale for the introduction of ICT in particular the claims that ICT can impact on educational standards; carry a vocational / social significance; and provide a catalyst for curriculum reform. The second section shows how each of these goals has been distorted by excessive optimism and a sense of 'inevitability'. The final section of the paper discusses the case for using ICT and argues for a more measured and adaptive policy and practice.

### **The introduction of the ICT into schools in England**

A feature of the attempt to introduce ICT into schools in England has been the consistent and proactive championing of technology by successive governments (see for example Buckingham, 2007; Twining, 2002; Wellington, 2005).

The first 'Computers in the Curriculum Project' was set up in 1973 and was followed by initiatives such as the 1981 'Micros in Schools' scheme; the Microelectronics Education Programme (MEP), (1980 until 1986) and the broader Technical and Vocational Initiative (TVEI). Interactive video was promoted in the 1980s alongside Neris, a teacher resource database available on line. Initiatives in the 1990s included support for the use of Integrated Learning Systems (ILS); multimedia laptops for teachers (1996-98) and the Education Department's Superhighways Initiative (1996 - 98). The focus on new technology was strengthened by new Labour Governments (1997 - 2010) (Selwyn, 2008). A National Grid for Learning (NGFL), in its first phase (1998-99), provided funds for hardware, software and Internet connectivity and this was followed by a raft of further projects and funding schemes. ICT CPD was undertaken by nearly all eligible teachers within New Opportunities Fund (or NoF) Training and a Building Schools for the Future (BSF) programme was set up in 2005 to

help local authorities and schools invest in new buildings with appropriate computer infrastructure. A key organising document in respect to the use of ICT was the Harnessing Technology initiative (DfES, 2005) which outlined the case for ICT in teaching and learning and set broad targets in order to reach 'e-maturity'. During all phases of the introduction of ICT, government agencies have been created to mediate between policy and schools: MESU, NCET and Becta, respectively. However much of the proactive support and direction concerning the use of new technology has been reduced by an incoming (2010) coalition government: Becta has been shut down and a more laissez faire approach to educational policy, at least in respect to technology, has been offered, even if ministers have at times continued to make pronouncements in favour of the use of ICT (eg Gove, 2012).

### **Why has ICT been promoted?**

Leaving aside the contribution of technology to management and administration, there has been a largely consistent rationale behind initiatives to promote ICT. In particular there has been an assumption that ICT can have a positive impact on standards, can provide more vocational relevance in the curriculum; and can be a catalyst for curriculum reform (see for example (Hawkridge, 1990; Reynolds, Treharne, & Tripp, 2003). All three are briefly described below:

#### *The belief that ICT can impact on standards*

Becta has produced varying evidence for the impact of ICT on standards (eg Cox et al, 2003; Harrison et al, 2006) with Underwood (2009) more confident in arguing that ICT led to noticeable and important learning gains in national curriculum subjects and across sectors. These gains were linked to the use of particular technologies (such as IWBs, learning platforms and broadband) and to particular affordances such as opportunities to support pupil-led research in the classroom; project-based learning; the development and sharing of lessons and learning resources and enriched delivery through the use of interactive whiteboards. Evidence of impact has been periodically taken up by ministers. A policy document (DfES, 2005) prefaced by

Charles Clarke, Secretary of State for Education at the time, suggested that the use of ICT could make an impact on assessment outcomes equivalent in some subjects to half a GCSE grade (the general academic qualification generally taken by pupils at sixteen years old). It was also claimed that achievement at key stage 2 (children aged from 7 - 11) was higher in schools with good ICT resources than schools with poor ICT resources, controlling for other relevant variables. These claims should be seen in context. An incoming Labour government had been influenced by two reports (McKinsey and Company, 1997; Stevenson, 1997) which argued that there was enough evidence to support a 'step change' in the role of computers in school. By the mid 2000's ministers felt able to claim that their policies had provided evidence that ICT 'worked'; it was time to close the argument and focus much more on how ICT worked and supporting schools in making it work.

#### *Vocational / economic relevance*

A second key concern, again particularly for policy makers, has been the economic / social relevance of new technology and its apparent contribution to the learning society and general vocational preparation. This comment by Kenneth Baker, Minister for Information Technology in 1981, is typical:

I want to ensure that the kids of today are trained with the skills that gave their fathers and grandfathers jobs. It's like generals fighting the battles of yesteryear ... and that is the reason why we've pushed ahead with computers into schools. I want youngsters, boys and girls leaving school at sixteen, to actually be able to operate a computer (cited Wellington, 1989, page xv)

This was echoed sixteen years later by Tony Blair (Prime Minister at the time) in introducing the NGFL, arguing that 'children cannot be effective in tomorrow's world if they are trained in yesterday's skills and that international competitiveness depended on up to date teaching and training' (DfEE, 1997). More recently in 2012 Michael Gove, the coalition Secretary of State for

Education, similarly found that ‘Our school system has not prepared children for this new world. Millions have left school over the past decade without even the basics they need for a decent job. And the current curriculum cannot prepare British students to work at the very forefront of technological change’ (Gove, 2012).

While there is agreement of the importance of the vocational agenda varying implications for practice have been drawn. The early introduction of computers in schools was more focused on awareness raising, implying a deficit model of children’s understanding of ICT. In recent years it has been more usual to point to young people’s extensive interest and participation with new technology out of school (eg DfES, 2005) and almost a sense that teachers themselves are at a deficit and holding learners back from something they have a strong disposition to use (Gove, 2012). There has been some further ambiguity in what being ‘able to use a computer’ may imply. At times this has meant programming a computer, something that has come back into fashion under the coalition government, but it might also mean being able to use the computer for creativity and worthwhile purposes within the wider curriculum. Hence the vocational agenda has led to both promotion of ICT as a subject and as a cross curricular skill, though there has not always been a coherent relationship between the two.

#### *A catalyst for curriculum reform*

The vocational rationale fuels a more general belief that through the use of technology what is being taught and learnt in school can be kept up to date creating some level of correspondence between schools and the societies they serve. Higgins and Mosely (2001: 204) describe two possible uses of ICT, the first ‘retrospective’ to accommodate an existing curriculum and the second forward looking and leading to radical changes in teaching and learning. The latter has tended to capture the imagination of teacher educators supporting the introduction of ICT into education (Hammond, 2011). Educators, while recognising the limitations of programmed instruction and often lukewarm on IWBs, have often seen technology as enabling a paradigm

shift in teaching and learning. ICT has become associated with collaborative and authentic learning as well as a more pragmatic relationship to knowledge (Dillon, 2004) and a less 'sacred' view of the curriculum (John, 2005) while Kennewell (2004), Scrimshaw (2004) and Twining et al (2006) have all argued in broadly similar ways for an association between ICT with a 'constructivist, student-centred' approach to teaching and learning. More recently the use of ICT has been incorporated into a concept of personalisation in which pupils have more autonomy and ownership (Underwood et al, 2009) an idea that has had some, albeit cautious, backing by progressively minded Ministers (Miliband, 2004). A more radical take on curriculum reform is provided by Facer (2011), who, in reviewing the Government supported 'Beyond Current Horizons' programme, envisaged a democratic type of educational provision taking due account of young people's changing sense of identity and digital working practices.

### **A distorted view of technology in the curriculum**

While young people's use of ICT has been periodically a cause for concern, even panic, in the popular press, its promotion in school has been largely accepted by policy makers, teacher educators, and indeed by teachers (eg Infogroup/ORC International, 2011) and parents (eg Marsh et al, 2005). However the nature and consequences of the introduction have been disputed particular by commentators offering a sociological / social science critique, see for example Buckingham (2007); Moran-Ellis & Cooper (2000); Robins & Webster (1999); Selwyn (1999; 2008; 2011); and Selwyn & Gorard (2003). One conclusion to be drawn from these varied sources is that policy and practice in the use of technology has been 'distorted'. In particular the use of ICT has been unquestioned, policy has focused on adoption rather than pedagogy and beliefs about ICT are characterised by determinism, for example a belief that children will find the use of computers inherently interesting or introducing ICT will necessarily lead to curriculum reform. ICT policy has tended to focus on the provision of new hardware, and an attempt to keep up with changing technological capabilities, rather than pedagogic understanding, with the

result that ‘lessons from the past’ are left unexplored (Rushby & Seabrook, 2008) Discussion of the contribution of ICT has been caught up in a largely aspirational and ‘inevitable’ discourse. This can be exemplified in the context of the three assumptions about, or rationales for, the use of ICT presented earlier.

*ICT cannot make a measurable impact on standards*

Many are prepared to accept that ICT can have an impact on aspects of teaching and learning, for example, helping to make the curriculum more accessible through the use of multi media and interactivity (eg Passey, Rogers, Machell, & McHugh, 2004). Pupils may take pride in the more professional presentation of work created at the computer (Cox et al, 2003) and technology may be particularly welcomed by those with special needs (Higgins, 2003) or disaffected from school (Duckworth, 2005). Going further, it is not difficult to take seriously the view expressed within Harnessing Technology that technology can enhance and extend the range of learning and even make it ‘more exciting’ (DfES, 2005). For example a recent report aimed at showcasing the use of learning platforms in schools in England provided evidence of an impact on parental involvement; encouragement for a more collaborative and learner centred pedagogy; organisational gains across the school; support for inclusion and opportunities for enhancing learning assessment (Jewitt et al, 2010), but whether any of this has a direct impact on assessed learning outcomes is doubtful. Even officially commissioned reporting is often ambiguous about the impact of ICT in general (eg Harrison et al, 2006; Watson, 1993) or specific technologies, for example the IWB (Moss et al, 2007). Those looking at the evidence ‘from a distance’ find it difficult to identify statistically significant impact (eg Andrews et al, 2005; Higgins, 2003) and Cox and Marshall (2007) note the lack of a longitudinal perspective or cost benefit analysis. Higgins (2003) suggests that the impact of ICT is modest compared to other interventions even if holding to the view that ICT, if used ‘effectively’ can make a difference (Higgins, 2003). The



lack of impact can be explained by practical and technical difficulties but also by three more fundamental issues.

First, technology invites difficulties as well as opportunities. For example IWB technology can help a teacher engage young people behaviourally through the use of multi media but this may result in overlong presentations and a ‘dumbing down’ of teacher explanation to a series of bullet points (see Reedy, 2008 and for a more general discussion of IWBs see Higgins 2007).

Behavioural and affective engagement, which ICT is seen as promoting, is important but it is not the same as cognitive engagement (Fredricks, Blumenfeld, & Paris, 2004).

Second and, more fundamentally, the kinds of activities which technology seem to promote do not lend themselves to experimental testing and ‘hard’ evidence of impact. This was certainly the case for learning platforms cited earlier, but raises a more general point regarding the changing nature of activity supported by ICT. For example a key affordance of data logging devices is that they allow learners to investigate contexts in which data are not easily captured by hand and eye; to compare automatic and manual data collection is not comparing ‘like with like’ and would necessarily favour learners more experienced with one type of context than the other.

Finally, as with all educational research what is being measured is so complex, and the intervention ‘ICT’ is often so difficult to define, as to offer little opportunity for establishing cause and effect. One aspect of the problem is deciding what to make of the novelty value of ICT. In fact novelty has been explained as Hawthorne effect but, just as plausibly, as constraining the use of ICT due to the problems of early adoption. The search for impact is can offer little more than what Bassey (2001) once called ‘fuzzy prediction’ or even what the philosopher Hume called ‘constant conjunctions’ and a disposition to impose causal relationships in contexts in which no causality can be claimed.

### *Why vocationalism misleads*

The vocational agenda has misled policy makers by putting economic relevance above pedagogical thinking. It has led to an overemphasis on ‘office’ software (a deficit model of learners’ past knowledge and experience) rather than build on home use (Selwyn et al, 2010) or the use of software developed by educators. There remains a home / school divide in terms of ICT: use in the home is more likely to be creative, communicative and game like, use in the school focused, linear and single tasking (Eynon, 2009; Valentine, Marsh, & Pattie, 2005).

The problem may not lie in vocationalism as an idea. Hodgkinson (1991: 80) once identified a progressive vocationalism concerned to promote autonomous decision making and the confidence to tackle real world problems and this would provide a useful perspective on teaching and learning with ICT. Instead the problem lies in a narrow form of vocationalism which has distorted both the qualification framework in England (eg Ofsted, 2011; Wolf, 2011) and the more general use of ICT. Teachers who base their use of ICT on its vocational value may see the teaching, or at least the learning of ICT skills, as an end in itself (eg Drenoyianni & Selwood, 1998). For example, the widespread reported practice of leaving children to use word processors for solely presentational purposes (eg Mumtaz & Hammond, 2002) is not aligned to any viable view of teaching writing skills but can be justified by the acquisition of ICT skills. The problem of distortion is long standing. The first large scale research undertaken to examine the impact of ICT in England (Watson, 1993:79) noted how some learning with ICT was viewed positively simply because a business application, an Excel spreadsheet, was being used, irrespective of the goals of the activity or the appropriateness of the software.

### *ICT is not a catalyst for curriculum reform*

The research literature has provided copious evidence that ICT has not been used as frequently or as desired by the optimists (Reynolds et al, 2003), a stance endorsed by Ofsted, the government inspection service for schools, in 2004:

As yet, the government's aim for ICT to become embedded in the work of schools is a reality in only a small minority of schools. More typical is a picture in which pupils' ICT experiences across the curriculum are sporadic and dependent on teachers; in many schools, opportunities to exploit the technology are lost on a daily basis. (Ofsted, 2004)

There are several reasons why adoption of ICT has been a challenge (e.g. Scrimshaw, 2004). At the school level there are often difficulties with lack of access to machines, the location of machines and access to technical support; the school ethos might not be supportive to the use of ICT and ICT policies might be underdeveloped (Condie, Munro, Seagraves, & Kenesson, 2007). There may be a lack of training and pedagogical leadership or shortcomings in the training provided. At the individual level teachers may lack confidence in using the technology. However even if these challenges could be overcome there is scant evidence that the widespread and indeed creative use of ICT would lead to a radically distinctive view of teaching and learning (eg Convery et al, 2006; Tearle, 2003) and the use of ICT remains a challenge of 'fitting it in' (Cartwright & Hammond, 2007). Teachers feel the need to adapt ICT resources to local circumstances (Hennessy, Ruthven, & Brindley, 2005) and new teachers may be trained and start their careers with a disposition to use ICT but their use becomes tailored to expectations (Slaouti & Barton, 2007). This picture of accommodation is shared internationally. For example Olson (1998; 2005) sees ICT as needing to be integrated into classroom routines or into what Cuban, Kirkpatrick and Peck (2001) describe as a 'grammar' of schooling. The wider world of the teacher is also convincingly evoked in research on workplace learning (eg Eruat, 2010; Hodgkinson & Hodgkinson, 2003) in which actions, including a decision whether or not to develop ICT in teaching, needs to be understood within a nested set of expectations and practices within school departments, schools themselves and the educational system as a whole. Teachers can, of course, exercise agency but are constrained by a wider ecology, albeit one which they have helped create.

## Discussion

This paper has examined policy and practice regarding the use of ICT in England and suggested that the claims made for the implementation of ICT into school do not stand up to critical scrutiny. The introduction of ICT has been justified as having the potential to make a 'significant' impact on learning outcomes, but such an impact is unlikely and methodologically implausible. A special association between ICT and a more personalised /learner centred / socially constructivist framework for teaching and learning has also been claimed but this is again unlikely. To borrow a term from Bijker (1997), technology is multi-dimensional; its use is not defined by designers or policy makers, rather it carries 'affordances', a form of negotiation between the user, the context in which the tool is being used and the properties of the technology (Hammond, 2010). Rather than promote meaningful change the use of technology has generated 'if only' narratives: if only the framework for teaching and learning could be changed (eg Lewin et al, 2003); if only governments had acted differently (eg Agalianos et al, 2001); if only a threshold in access could be crossed (eg Watson, 1983); or, in the USA context, if only teachers could change their minds about the nature of teaching and learning (Ertmer, 2005).

A key organising principle for those promoting the use of technology, both in England and more globally (eg Looi, 2001; Mastrangelo & Loncarevic, 2004 and Plomp et al, 2009; Smeet, 2005) has been that schooling should move towards a degree of correspondence with the wider world. Correspondence, of course, is not a new idea. For example structural Marxists (see Livingstone, 1995), influential in the later part of the twentieth century, argued that over time educational systems became more aligned with the needs and interests of the capitalist state both in terms of the skills they promote and the conformity they encourage. Old style marxist correspondence provided both an explanation for the development of schools and a critique of educational practice. In contrast this more recent notion of technological correspondence turns the assumptions of structural marxism on their head. The problem with schooling is that it is too

divorced from the wider world, not too close to it, and correspondence, if properly understood, is to be encouraged as it might lead to a more critical, creative and technologically rich curriculum better suited to working practices in the post modern economy (Hargreaves, 1994; 2003). However there are at least two major problems with this notion of technological correspondence. First, much less benign technological futures are, and have always been, on offer (eg Peters, 2001) in which unemployment, along with deskilling and intensification at work, are seen as increasingly the norm. Curriculum reformers are offering correspondence with an idealised social reality rather than social reality as it is. Second, policy makers and schools themselves tend to hold out against correspondence. In particular schools 'enjoy' a relative autonomy and seek to balance a range of, at times, contradictory goals and practices. Education is and remains a contested concept, the aims of which are difficult to pin down (Desjardins, 2008). Schools have what Hodkinson & Hodkinson (2003) describe as 'secret stories' which make them resistant to official discourses about teaching and when teachers talk about their work they offer their own interpretations of their goals and the ways in which they evaluate learners and learning (eg Alexander, 2010).

The problem, then, with the rationale given for the introduction of ICT is that it has oversimplified a complex issue. This fits into a wider narrative (eg Ball, 1990) in which educational policies present an idealised picture in order to provide an orientation to change. However in the case of new technology this idealised picture has set the bar for evaluating the contribution of ICT impossibly high. A more realistic appraisal of the contribution of ICT is needed. Such an appraisal would take into account that ICT is used routinely for teacher preparation and in classroom teaching, certainly in respect to the use of the IWB (eg Infogroup/ORC International, 2011). It would note the introduction and development of a wide array of specialist technology based courses. Furthermore, ICT remains popular amongst teachers and pupils generally welcome the use of ICT and use it routinely, even if in a limited way, outside the classroom. Finally the widespread use of social networking has created a disposition towards a wider and

more interactive view of teaching and learning as exemplified in relation to learning platforms. Critics see ICT policy as something to be explained away by the malign influence of commercial providers; a false consciousness on the part of policy makers; or a form of reification among educators through which technology is invested with objective qualities which are in reality socially constructed. However this is to underestimate the degree to which schools have adapted technology and framed it for their own purposes: ICT may not be catalytic but teachers frequently find its use worthwhile and there are many compelling and engaging accounts of classroom practice. Kennewell, addressing a practitioner audience, notes that ‘when you observe pupils using ICT, rather than traditional methods, you usually notice a higher level of motivation, a more intense engagement with the activity’ (Kennewell, 2004:23). This is highly important in explaining the attraction of ICT even if ‘engagement’ is not to be taken for granted and ‘impact on learning’ is much more complex than many commentators allow. Technology seems to have a persistent appeal and new technology generates what Latour once called a flux of possibilities that at least some educators seem ready to embrace (Latour, 2002).

Discussion of technology is prone to excess and all too easily fits into an optimistic / pessimistic rhetoric as identified by Reynolds et al (2003) and picked up by Selwyn (2011) writing in ‘praise of pessimism’. However neither excessive hope or despair is necessary: the attempt to develop the use of ICT in school has presented contradictions and challenges in which opportunities and constraints are complementary, outcomes are not easily captured and possibilities emerge but are constrained at macro, meso and micro levels. This leads to some interesting implications for future policy and for those trying to lead change in schools. In particular policy makers need to be more measured about their policies. Ministers should not avoid making decisions and offering rationales but they need to be aware that all educational policies will be re interpreted by teachers as they carry out their daily work; outcomes of policies may be disappointing, at times simply unexpected. Policy can do no more than provide the big picture, schools need to be provided with the flexibility to adapt policies and policy makers must themselves adapt to feedback. In

place of pathfinder projects genuine pilots are needed (Chapman, 2002). Two initiatives related to the introduction of technology illustrate the need for adaptability very well. The first, the TVEI initiative, has been repeatedly identified as a political decision, the whim of a conservative minister of information technology (Perry et al, 2010). Yet, while open to dispute, some commentators saw TVEI as reinvigorating teaching because it was educator led and because it gave teachers and head teachers the flexibility to adapt the programme to local circumstances (Hazelwood et al, 1988; Merson, 1992; Hodgkinson, 1991). The second, NoF training (an attempt to provide training to all teachers), was generated from a much more considered and consensual approach. In contrast to TVEI, NoF training was seen as top down and inflexible; the outcomes of NoF were a resounding disappointment (eg Conlon, 2004; Ofsted, 2004; Perry et al, 2010).

Any rationale given for the use of ICT will always be redefined within cultures of teaching. Those working to develop the use of ICT in schools need not take these cultures for granted or play down limitations of practice, but they do need to find a way of marrying teachers' personal interests and motivations with wider strategic goals (Holmes, Gardner, & Galanouli 2007). There is strong evidence that where ICT CPD has managed this, and where educators and school leaders have provided support and sustained critical feedback, teachers can develop their use of technology in ways that appeal to learners and to wider goals of professional development (eg Convery et al, 2006; Somekh et al, 2007). There need not be an iron curtain between home and school use of technology (Kent & Facer, 2004). The results of these kinds of interventions are rarely a revolution in schooling, but they do provide the basis for developing more measured and adaptive policy and practice.

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